



## **Local Assistance Webinar**

## **State of Good Repair Project Selection Process**

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# Prioritization Formula

*Why?*

# Recent Developments

- MAP-21 and FAST Act
- HB1887 (State of Good Repair)
- AASHTO Elements
- Sunset of Pontis 4.4

***Responsibility for Funding and Performance for Local Bridges***

# MAP-21 and FAST Act

- **Condition Performance Measures – Apply to *All* of Virginia's Bridges**
  - Structurally Deficient Deck Area
  - Percentage of Bridges in Good Condition
  - Percentage of Bridges in Poor Condition
  - We are going to be partially responsible for local bridges
- **Asset Management Plan – Must Include:**
  - Risk
  - Condition
  - Life Cycle Analysis
- **AASHTO Elements**
  - Localities are now required to report element data

# What is the State of Good Repair?

- **Dedicated Funding to Address Deficient Bridges and Pavements**
- **Funds Distributed to VDOT and Localities**
  - ***The State of Good Repair is NOT a Maintenance Program***
  - ***The State of Good Repair is NOT Strictly for Bridge Replacements***
  - ***Bridges and Projects are Selected Through Formula per the CTB***

# General Prioritization Formula

**Priority Rank =**

**30% Importance**  
**+ 25% Condition**  
**+ 15% Design Redundancy (risk)**  
**+ 10% Structure Capacity (Clearances, Posting)**  
**+ 20% Cost-Effectiveness**

**Max Score = 1.0**

**Min Score = 0.0**

**All five variables have a 0 to 1.0 scale and are dimensionless**

## Description of Variables – Importance Factor

**IF:** Importance Factor.

Measures *relative* importance of the structure to the roadway network

Uses these variables:

- Traffic
- Truck traffic
- Proximity to schools, hospitals and emergency facilities
- Detour vs. traffic
- Functional class of roadway
- Predicted future ADT growth

Importance Factor is the subject of a paper published by the Virginia Transportation Research Council. Closed bridges are assigned an Importance Factor of zero

## Description of the Variables - Condition

**Condition is measured using the Modified Health Index (MHI)\***

- ***Condition* = 1 – MHI**

\* **Modified Health Index** is based on element data. If data are not available, Condition is based on a weighted average of the structure's General Condition Ratings



## Tying Condition to Value The “Modified Health Index”

$$\text{Equity} = \text{MHI} * \text{Structure Replacement Cost}$$

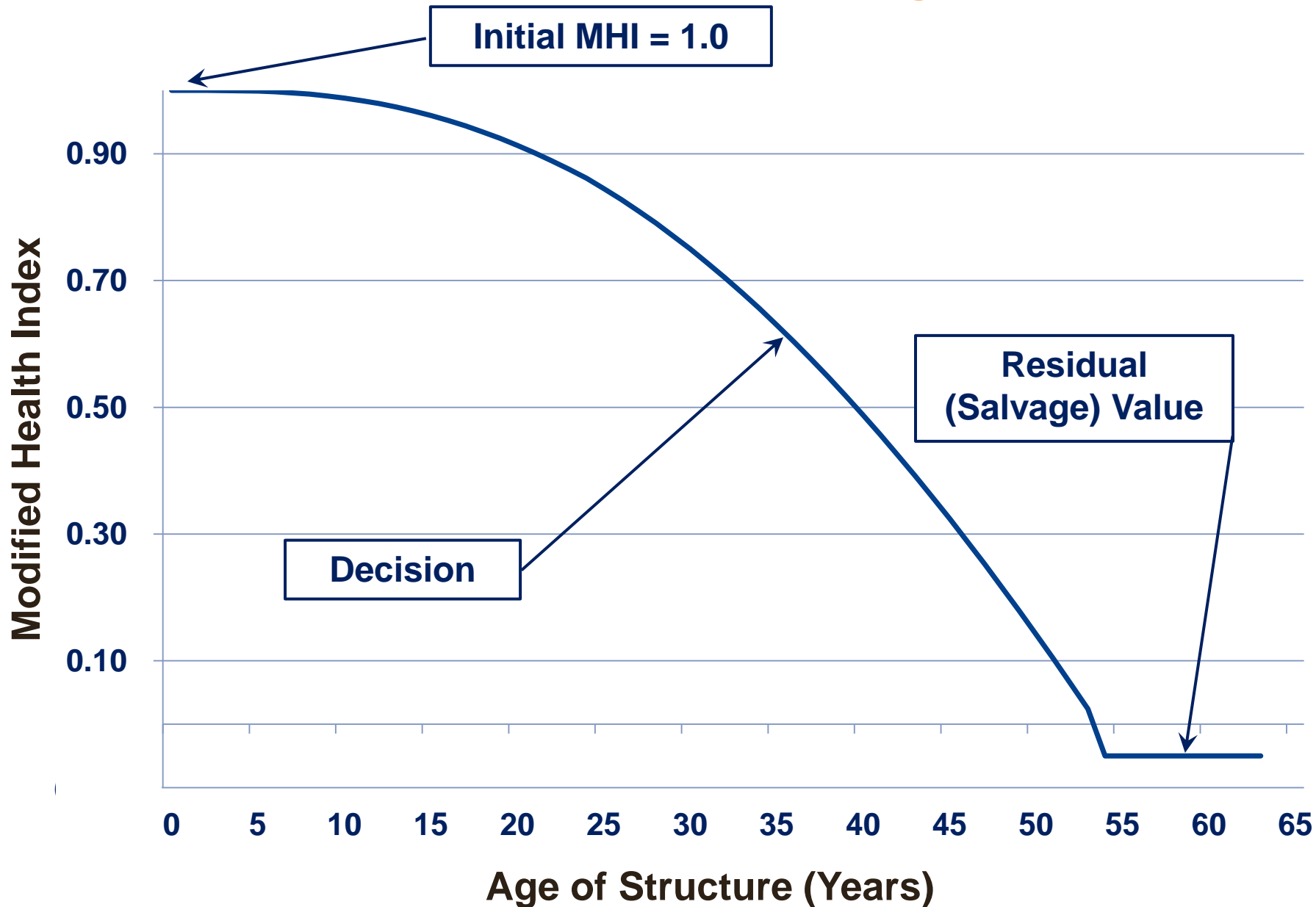
**Example Structure:**

**MHI= .32**

**Replacement Value = \$1,000,000**

$$\text{Equity} = .32 * 1,000,000 = \$320,000$$

# Modified Health Index – Variation with Age of Structure



# DRF = Design Redundancy Factor (Risk)

$$\text{DRF} = \text{Part A} + \text{Part B} \leq 1.0$$

## Part A

= 0.75 if one of Scour Critical or Fracture Critical exists

= 0.90 if both of Scour Critical or Fracture Critical exists

## Part B

= 0.10 if one of Seismic Critical or Fatigue Prone Details exists

= 0.20 if both of Seismic Critical or Fatigue Prone Details exists

## **SCF = Structure Capacity Factor (Function)**

$$\begin{aligned} \text{SCF} = & \quad 40\% \text{ (Weight Reduction Factor)} \\ & + \quad 30\% \text{ (Waterway/Vertical Clearance Factor)} \\ & + \quad 30\% \text{ (Deck Width Factor)} \end{aligned}$$

- **Weight Reduction Factor (WRF) = 0 to 1.0 score measuring ability of structure to carry Fire Trucks, Ambulances, School Buses and Design Vehicles**
- **Waterway/Vertical Clearance Factor = 0 to 1.0 score measuring the adequacy of vertical clearance for waterways, railways and trucks**
- **Deck Width Factor = 0 to 1.0 score measuring adequacy of deck width vs need**

**The Weight Reduction Factor is the subject of a paper published through the Virginia Transportation Research Council**

## **CEF = Cost-Effectiveness Factor**

**CEF = a function of the ratio of Repair Cost (RC) to Structure Replacement Cost (SRC)**

$$\text{CEF} = -2(\text{RF}/\text{SRC}) + 1.3, \text{ Max } 1.00, \text{ Min } 0.00$$

**Where:**

**RF = Requested Funds**

**SRC = Structure Replacement Cost: Uses Bridge Management System estimates**

# Example Initial Prioritization List for Bristol District

BRISTOL DISTRICT						General Condition Rating				30%	25%	15%	10%	20%		Local Input Required		
Bridge Federal ID	Sys	City or County Name	Route No.	Facility	Open Posted Closed	Deck GCR	Super Structure	Sub Structure	Culv GCR	Importance Factor (Percentile Rank)	Condition Factor (Percentile Rank)	Design Redundancy Factor (Formula Score)	Structure Capacity Factor (Percentile Rank)	Cost Effectiveness Factor (Formula Score)	Current SGR Score	Recommended Action Cost *	Recommended Action Description	Structure Replacement Cost**
22467	P	Richlands	460	FRONT STREET	A	4	4	5	N	0.79	0.65	0.00	0.25	0.89	0.603	\$ 1,726,845	Replace Deck& Bearings, Repair Structural Steel, Repair	\$ 8,453,865
29785	U	Buchanan	3310	Mott Branch Rd.	P	6	6	4	N	0.50	0.18	0.75	0.73	1.00	0.581	\$ 80,850	Remove Asphalt Overlay, Reseal Longitudinal Joints, Waterproof Tops of Box Beams, Place New Asphalt	\$ 1,342,177
19974	U	Bristol	0	FAIRVIEW ST.	A	5	4	5	N	0.73	0.46	0.00	0.09	1.00	0.543	\$ 232,256	Mill/Patch/Rigid Overlay Deck, Waterproof Sidewalks,	\$ 2,629,525
22546	P	Tazewell	19	RT.19 & 460 BUS.	A	5	4	4	N	0.46	0.75	0.00	0.38	0.74	0.511	\$ 937,627	Replace Superstructure and Repair Substructure	\$ 3,323,781
29794	U	Buchanan	4025	Curve Hollow Rd.	P	5	5	4	N	0.52	0.57	0.75	0.72	0.00	0.483	\$ 581,504	Replace Bridge	\$ 581,507
22548	P	Tazewell	61	ROUTE 61	A	4	5	5	N	0.81	0.41	0.00	0.36	0.47	0.476	\$ 1,434,541	Replace Superstructure and Repair Substructure	\$ 3,472,054
22542	P	Tazewell	16	WEST RIVERSIDE DR.	P	4	4	4	N	0.66	0.82	0.00	0.70	0.00	0.473	\$ 3,323,781	Replace Bridge	\$ 3,323,781
19965	U	Big Stone Gap	0	SHAWNEE AVE. WEST	P	4	3	4	N	0.09	0.96	0.75	0.92	0.00	0.472	\$ 3,129,173	Replace Bridge	\$ 3,129,173
29712	U	Buchanan	3050	Booth Branch Rd.	P	6	5	3	N	0.33	0.65	0.75	0.95	0.00	0.469	\$ 1,179,226	Replace Bridge	\$ 1,179,232
29744	U	Buchanan	2080	Jackson Rd.	P	5	4	5	N	0.52	0.46	0.00	0.79	0.56	0.462	\$ 224,243	Replace Superstructure and Repair Substructure	\$ 606,992
29702	U	Buchanan	3137	Sugar Bend Rd.	P	5	5	5	N	0.61	0.27	0.75	0.95	0.00	0.458	\$ 822,451	SD - Structural Evaluation	\$ 822,451
29803	U	Buchanan	4263	Campground Rd.	P	6	5	4	N	0.68	0.34	0.75	0.52	0.00	0.454	\$ 1,080,378	Replace Bridge	\$ 1,080,383
29808	U	Buchanan	4245	Monroe Rd.	P	6	4	5	N	0.56	0.30	0.00	0.85	0.59	0.445	\$ 395,484	Replace Superstructure and Repair Substructure	\$ 1,109,729
22543	P	Tazewell	16	WEST RIVERSIDE DR.	P	5	4	7	N	0.63	0.12	0.00	0.20	1.00	0.439	\$ 357,810	Mill/Patch/Place Rigid Overlay Deck, Replace Bearings, Repair & Recoat Structural Steel	\$ 4,050,472
22469	P	Richlands	67	2ND STREET	A	4	6	6	N	0.74	0.10	0.00	0.25	0.83	0.438	\$ 2,032,794	Replace Deck, Recoat Structural Steel, Repair	\$ 8,633,800
29731	U	Buchanan	2078	Staggerweed Rd.	P	5	4	6	N	0.64	0.24	0.00	0.87	0.48	0.435	\$ 333,082	Replace Superstructure and Repair Substructure	\$ 814,728
20001	U	Bristol	0	PIEDMONT AVE.	P	4	4	4	N	0.31	0.82	0.75	0.18	0.00	0.429	\$ 45,312,003	Replace Bridge	\$ 45,312,003
30534	O	Buchanan	0	BLUE STONE ROAD	P	6	4	6	N	0.18	0.14	0.75	0.86	0.65	0.418	\$ 174,442	Replace Superstructure and Repair Substructure	\$ 537,489
29801	U	Buchanan	1030	W.P.Harris Rec.Pk	P	6	7	6	N	0.67	0.03	0.75	0.95	0.00	0.416	\$ 701,979	SD - Structural Evaluation	\$ 701,979
29759	U	Buchanan	2164	Route 2164	P	4	5	4	N	0.58	0.74	0.00	0.55	0.00	0.414	\$ 657,957	Replace Bridge	\$ 657,960
29696	U	Buchanan	5417	Bob Casey Rd.	P	6	5	5	N	0.55	0.16	0.75	0.87	0.00	0.405	\$ 745,997	SD - Structural Evaluation	\$ 745,997
22441	U	Norton	0	MAIN AVENUE SW	P	4	4	6	N	0.41	0.36	0.00	0.47	0.72	0.404	\$ 344,569	Replace Superstructure and Repair Substructure	\$ 1,190,816
22547	P	Tazewell	61	EAST RIVERSIDE DR.	P	4	4	4	N	0.48	0.82	0.00	0.51	0.00	0.400	\$ 3,519,934	Replace Bridge	\$ 3,519,934
20608	U	Marion	0	EAST CHILHOWIE ST	P	7	4	7	N	0.31	0.05	0.75	0.75	0.53	0.399	\$ 1,371,734	Replace Superstructure and Repair Substructure: 1885 - Culture Resource Review	\$ 3,553,913
22423	U	Bluefield	0	TAZEWELL AVENUE	P	4	5	7	N	0.37	0.09	0.00	0.81	0.91	0.396	\$ 394,998	Replace Deck, Repair & Recoat Structural Steel, Repair	\$ 2,024,850
29679	U	Tazewell	0	FINCASTLE FARM RD	P	5	4	4	N	0.06	0.75	0.75	0.75	0.00	0.393	\$ 669,541	Replace Bridge	\$ 669,544
29739	U	Buchanan	2435	Dan Branch Rd	P	5	5	4	N	0.28	0.57	0.75	0.53	0.00	0.392	\$ 570,693	Replace Bridge	\$ 570,696
22539	U	Tazewell	0	PISGAH ROAD	P	4	4	5	N	0.26	0.65	0.00	0.62	0.42	0.386	\$ 311,421	Replace Superstructure and Repair Substructure	\$ 705,068
29711	U	Buchanan	3053	Big John Stacey Rd	K	6	4	3	N	0.00	0.81	0.75	0.66	0.00	0.381	\$ 1,386,961	Replace Bridge	\$ 1,386,968
29685	U	Buchanan	5105	Central Shop Rd.	A	4	4	5	N	0.27	0.65	0.75	0.25	0.00	0.381	\$ 1,807,837	Replace Bridge	\$ 1,807,847
29760	U	Buchanan	2163	Highland Rd.	P	5	4	7	N	0.59	0.12	0.00	0.76	0.48	0.379	\$ 359,015	Replace Superstructure and Repair Substructure	\$ 878,053
19968	P	Big Stone Gap	23	US23(GILLEY AVE.E)	A	6	5	5	N	0.92	0.16	0.00	0.43	0.00	0.359	\$ 4,454,361	SD - Structural Evaluation	\$ 4,454,361
19971	U	Bristol	0	GOODSON STREET	A	6	4	4	N	0.62	0.62	0.00	0.09	0.00	0.350	\$ 2,276,593	Replace Bridge	\$ 2,276,605
22611	U	Saltville	0	GOV. PLANT ROAD	A	6	6	4	N	0.29	0.18	0.00	0.18	1.00	0.350	\$ 413,875	Remove & Replace Overlay, Reseal Joints, Waterproof Box Beams, Parapets & Box Beams, Repair Sub	\$ 4,560,932
22425	U	Bluefield	0	HOCKMAN PIKE	K	4	5	5	N	0.00	0.41	0.00	0.56	0.77	0.312	\$ 500,342	Replace Superstructure and Repair Substructure	\$ 1,871,944
29793	U	Buchanan	4062	RainesSch.HollowRd	P	5	5	5	N	0.55	0.27	0.00	0.78	0.00	0.311	\$ 881,914	SD - Structural Evaluation	\$ 881,914
19982	U	Bristol	0	OAK STREET	P	4	4	4	N	0.12	0.82	0.00	0.68	0.00	0.309	\$ 3,750,065	Replace Bridge	\$ 3,750,065
26766	U	Bristol	0	STATE STREET	A	7	7	8	N	0.94	0.00	0.00	0.23	0.00	0.305	\$ 3,506,033	SD - Waterway Adequacy	\$ 3,506,033
29721	U	Buchanan	2070	Woodcrest Rd.	A	6	4	7	N	0.52	0.07	0.00	0.31	0.46	0.296	\$ 229,233	Replace Superstructure and Repair Substructure	\$ 542,895
20004	U	Bristol	0	M.L.K. JR. BLVD.	A	4	6	6	N	0.71	0.10	0.00	0.00	0.23	0.284	\$ 2,510,806	Replace Superstructure and Repair Substructure	\$ 4,689,126
22461	U	Richlands	0	ALLEGHENY ST.	P	7	4	5	N	0.07	0.20	0.00	0.60	0.59	0.250	\$ 481,587	Replace Superstructure and Repair Substructure	\$ 1,363,028
29818	U	Buchanan	5130	Turndown Rd.	P	5	4	5	N	0.06	0.46	0.00	0.94	0.00	0.227	\$ 1,081,922	Replace Bridge	\$ 1,081,928
22544	P	Tazewell	16	FAIRGROUND ROAD	A	5	4	7	N	0.45	0.12	0.00	0.39	0.00	0.204	\$ 4,482,139	Replace Bridge	\$ 4,482,162
29802	U	Buchanan	4261	Bright Leaf Rd.	P	6	6	7	N	0.34	0.03	0.00	0.88	0.00	0.198	\$ 657,960	SD - Structural Evaluation	\$ 657,960
30533	U	Buchanan	0	PRIVATE ENTRANCE	P	7	7	8	N	0.24	0.00	0.00	0.78	0.00	0.150	\$ 711,246	SD - Structural Evaluation	\$ 711,246

# Grey Fields are Objective Inventory and Condition Data from Localities and VDOT Information Systems

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26766	U	Bristol	0	STATE STREET	A	7	7	8	N	0.94	0.00	0.00	0.23	0.00	0.305	\$ 3,506,033	SD - Waterway Adequacy	\$ 3,506,033
29721	U	Buchanan	2070	Woodcrest Rd.	A	6	4	7	N	0.52	0.07	0.00	0.31	0.46	0.296	\$ 229,233	Replace Superstructure and Repair Substructure	\$ 542,895
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22461	U	Richlands	0	ALLEGHENY ST.	P	7	4	5	N	0.07	0.20	0.00	0.60	0.59	0.250	\$ 481,587	Replace Superstructure and Repair Substructure	\$ 1,363,028
29818	U	Buchanan	5130	Turndown Rd.	P	5	4	5	N	0.06	0.46	0.00	0.94	0.00	0.227	\$ 1,081,922	Replace Bridge	\$ 1,081,928
22544	P	Tazewell	16	FAIRGROUND ROAD	A	5	4	7	N	0.45	0.12	0.00	0.39	0.00	0.204	\$ 4,482,139	Replace Bridge	\$ 4,482,162
29802	U	Buchanan	4261	Bright Leaf Rd.	P	6	6	7	N	0.34	0.03	0.00	0.88	0.00	0.198	\$ 657,960	SD - Structural Evaluation	\$ 657,960
30533	U	Buchanan	0	PRIVATE ENTRANCE	P	7	7	8	N	0.24	0.00	0.00	0.78	0.00	0.150	\$ 711,246	SD - Structural Evaluation	\$ 711,246

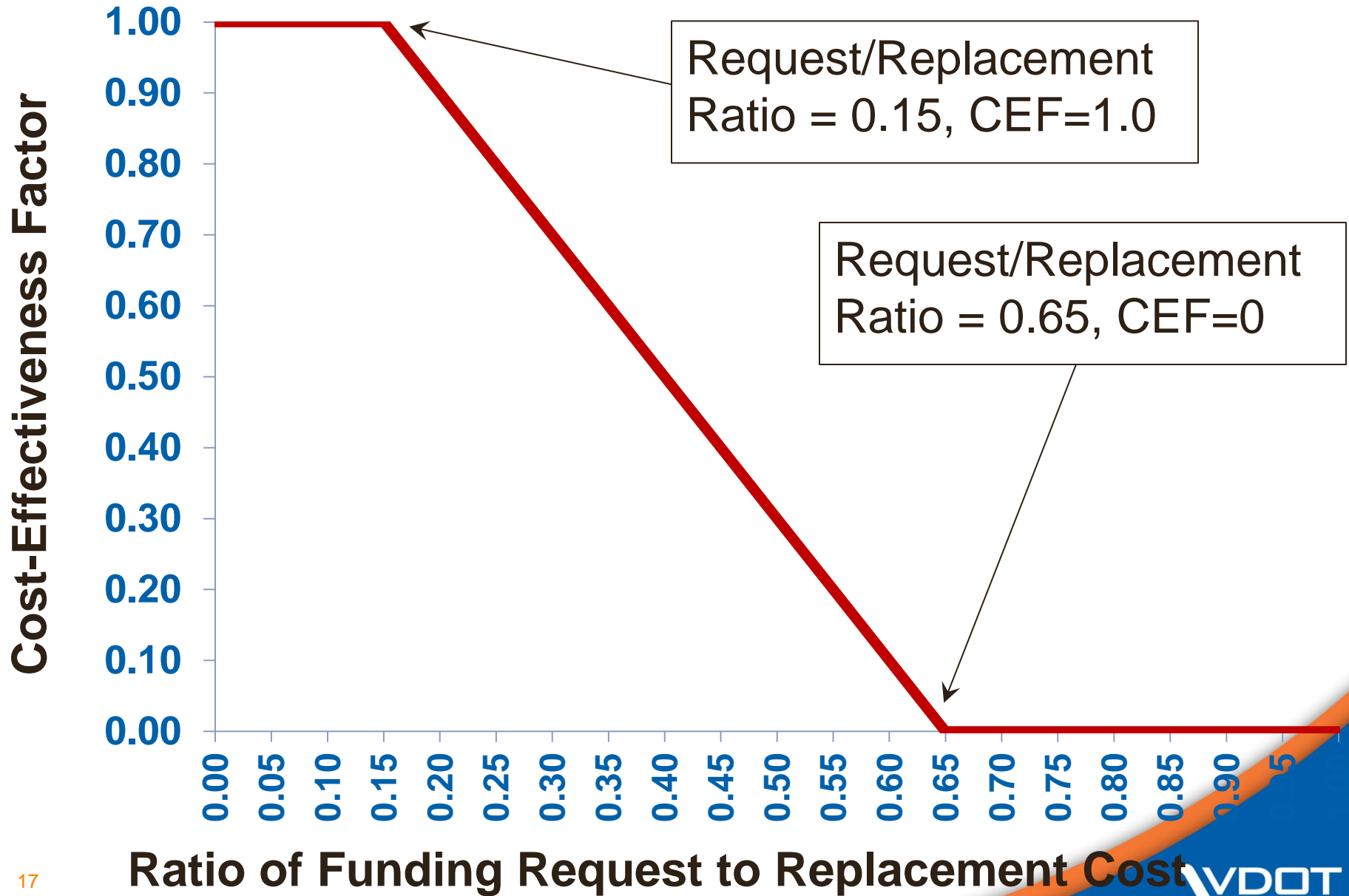


# Localities Can Control Yellow Fields in Funds Request

BRISTOL DISTRICT						General Condition Rating				30%	25%	15%	10%	20%		Local Input Required			
Bridge Federal ID	Sys	City or County Name	Route No.	Facility	Open Posted Closed	Deck GCR	Super Structure	Sub Structure	Culv GCR	Importance Factor (Percentile Rank)	Condition Factor (Percentile Rank)	Design Redundancy Factor (Formula Score)	Structure Capacity Factor (Percentile Rank)	Cost Effectiveness Factor (Formula Score)	Current SGR Score	Recommended Action Cost *	Recommended Action Description	Structure Replacement Cost**	
22467	P	Richlands	460	FRONT STREET	A	4	4	5	N	0.79	0.65	0.00	0.25	0.89	0.603	\$ 1,726,845	Replace Deck& Bearings, Repair Structural Steel, Repair	\$ 8,453,865	
29785	U	Buchanan	3310	Mott Branch Rd.	P	6	6	4	N	0.50	0.18	0.75	0.73	1.00	0.581	\$ 80,850	Remove Asphalt Overlay, Reseal Longitudinal Joints, Waterproof Tops of Box Beams, Place New Asphalt	\$ 1,342,177	
19974	U	Bristol	0	FAIRVIEW ST.	A	5	4	5	N	0.73	0.46	0.00	0.09	1.00	0.543	\$ 232,256	Mill/Patch/Rigid Overlay Deck, Waterproof Sidewalks,	\$ 2,629,525	
22546	P	Tazewell	19	RTE.19 & 460 BUS.	A	5	4	4	N	0.46	0.75	0.00	0.38	0.74	0.511	\$ 937,627	Replace Superstructure and Repair Substructure	\$ 3,323,781	
29794	U	Buchanan	4025	Curve Hollow Rd.	P	5	5	4	N	0.52	0.57	0.75	0.72	0.00	0.483	\$ 581,504	Replace Bridge	\$ 581,507	
22548	P	Tazewell	61	ROUTE 61	A	4	5	5	N	0.81	0.41	0.00	0.36	0.47	0.476	\$ 1,434,541	Replace Superstructure and Repair Substructure	\$ 3,472,054	
22542	P	Tazewell	16	WEST RIVERSIDE DR.	P	4	4	4	N	0.66	0.82	0.00	0.70	0.00	0.473	\$ 3,323,781	Replace Bridge	\$ 3,323,781	
19965	U	Big Stone Gap	0	SHAWNEE AVE. WEST	P	4	3	4	N	0.09	0.96	0.75	0.92	0.00	0.472	\$ 3,129,173	Replace Bridge	\$ 3,129,173	
29712	U	Buchanan	3050	Booth Branch Rd.	P	6	5	3	N	0.33	0.65	0.75	0.95	0.00	0.469	\$ 1,179,226	Replace Bridge	\$ 1,179,232	
29744	U	Buchanan	2080	Jackson Rd.	P	5	4	5	N	0.52	0.46	0.00	0.79	0.56	0.462	\$ 224,243	Replace Superstructure and Repair Substructure	\$ 606,992	
29702	U	Buchanan	3137	Sugar Bend Rd.	P	5	5	5	N	0.61	0.27	0.75	0.95	0.00	0.458	\$ 822,451	SD - Structural Evaluation	\$ 822,451	
29803	U	Buchanan	4263	Campground Rd.	P	6	5	4	N	0.68	0.34	0.75	0.52	0.00	0.454	\$ 1,080,378	Replace Bridge	\$ 1,080,383	
29808	U	Buchanan	4245	Monroe Rd.	P	6	4	5	N	0.56	0.30	0.00	0.85	0.59	0.445	\$ 395,484	Replace Superstructure and Repair Substructure	\$ 1,109,729	
22543	P	Tazewell	16	WEST RIVERSIDE DR.	P	5	4	7	N	0.63	0.12	0.00	0.20	1.00	0.439	\$ 357,810	Mill/Patch/Place Rigid Overlay Deck, Replace Bearings, Repair & Recoat Structural Steel	\$ 4,050,472	
22469	P	Richlands	67	2ND STREET	A	4	6	6	N	0.74	0.10	0.00	0.25	0.83	0.438	\$ 2,032,794	Replace Deck, Recoat Structural Steel, Repair	\$ 8,633,800	
29731	U	Buchanan	2078	Staggerweed Rd.	P	5	4	6	N	0.64	0.24	0.00	0.87	0.48	0.435	\$ 333,082	Replace Superstructure and Repair Substructure	\$ 814,728	
20001	U	Bristol	0	PIEDMONT AVE.	P	4	4	4	N	0.31	0.82	0.75	0.18	0.00	0.429	\$ 45,312,003	Replace Bridge	\$ 45,312,003	
30534	O	Buchanan	0	BLUE STONE ROAD	P	6	4	6	N	0.18	0.14	0.75	0.86	0.65	0.418	\$ 174,442	Replace Superstructure and Repair Substructure	\$ 537,489	
29801	U	Buchanan	1030	W.P.Harris Rec.Pk	P	6	7	6	N	0.67	0.03	0.75	0.95	0.00	0.416	\$ 701,979	SD - Structural Evaluation	\$ 701,979	
29759	U	Buchanan	2164	Route 2164	P	4	5	4	N	0.58	0.74	0.00	0.55	0.00	0.414	\$ 657,957	Replace Bridge	\$ 657,960	
29696	U	Buchanan	5417	Bob Casey Rd.	P	6	5	5	N	0.55	0.16	0.75	0.87	0.00	0.405	\$ 745,997	SD - Structural Evaluation	\$ 745,997	
22441	U	Norton	0	MAIN AVENUE SW	P	4	4	6	N	0.41	0.36	0.00	0.47	0.72	0.404	\$ 344,569	Replace Superstructure and Repair Substructure	\$ 1,190,816	
22547	P	Tazewell	61	EAST RIVERSIDE DR.	P	4	4	4	N	0.48	0.82	0.00	0.51	0.00	0.400	\$ 3,519,934	Replace Bridge	\$ 3,519,934	
20608	U	Marion	0	EAST CHILHOWIE ST	P	7	4	7	N	0.31	0.05	0.75	0.75	0.53	0.399	\$ 1,371,734	Replace Superstructure and Repair Substructure: 1885 - Culture Resoure Review	\$ 3,553,913	
22423	U	Bluefield	0	TAZEWELL AVENUE	P	4	5	7	N	0.37	0.09	0.00	0.81	0.91	0.396	\$ 394,998	Replace Deck, Repair & Recoat Structural Steel, Repair	\$ 2,024,850	
29679	U	Tazewell	0	FINCASTLE FARM RD	P	5	4	4	N	0.06	0.75	0.75	0.75	0.00	0.393	\$ 669,541	Replace Bridge	\$ 669,544	
29739	U	Buchanan	2435	Dan Branch Rd	P	5	5	4	N	0.28	0.57	0.75	0.53	0.00	0.392	\$ 570,693	Replace Bridge	\$ 570,696	
22539	U	Tazewell	0	PISGAH ROAD	P	4	4	5	N	0.26	0.65	0.00	0.62	0.42	0.386	\$ 311,421	Replace Superstructure and Repair Substructure	\$ 705,068	
29711	U	Buchanan	3053	Big John Stacey Rd	K	6	4	3	N	0.00	0.81	0.75	0.66	0.00	0.381	\$ 1,386,961	Replace Bridge	\$ 1,386,968	
29685	U	Buchanan	5105	Central Shop Rd.	A	4	4	5	N	0.27	0.65	0.75	0.25	0.00	0.381	\$ 1,807,837	Replace Bridge	\$ 1,807,847	
29760	U	Buchanan	2163	Highland Rd.	P	5	4	7	N	0.59	0.12	0.00	0.76	0.48	0.379	\$ 359,015	Replace Superstructure and Repair Substructure	\$ 878,053	
19968	P	Big Stone Gap	23	US23(GILLEY AVE.E)	A	6	5	5	N	0.92	0.16	0.00	0.43	0.00	0.359	\$ 4,454,361	SD - Structural Evaluation	\$ 4,454,361	
19971	U	Bristol	0	GOODSON STREET	A	6	4	4	N	0.62	0.62	0.00	0.09	0.00	0.350	\$ 2,276,593	Replace Bridge	\$ 2,276,605	
22611	U	Saltville	0	GOV. PLANT ROAD	A	6	6	4	N	0.29	0.18	0.00	0.18	1.00	0.350	\$ 413,875	Remove & Replace Overlay, Reseal Joints, Waterproof Box Beams, Parapets & Box Beams, Repair Sub	\$ 4,560,932	
22425	U	Bluefield	0	HOCKMAN PIKE	K	4	5	5	N	0.00	0.41	0.00	0.56	0.77	0.312	\$ 500,342	Replace Superstructure and Repair Substructure	\$ 1,871,944	
29793	U	Buchanan	4062	RainesSch.HollowRd	P	5	5	5	N	0.55	0.27	0.00	0.78	0.00	0.311	\$ 881,914	SD - Structural Evaluation	\$ 881,914	
19982	U	Bristol	0	OAK STREET	P	4	4	4	N	0.12	0.82	0.00	0.68	0.00	0.309	\$ 3,750,065	Replace Bridge	\$ 3,750,065	
26766	U	Bristol	0	STATE STREET	A	7	7	8	N	0.94	0.00	0.00	0.23	0.00	0.305	\$ 3,506,033	SD - Waterway Adequacy	\$ 3,506,033	
29721	U	Buchanan	2070	Woodcrest Rd.	A	6	4	7	N	0.52	0.07	0.00	0.31	0.46	0.296	\$ 229,233	Replace Superstructure and Repair Substructure	\$ 542,895	
20004	U	Bristol	0	M.L.K. JR. BLVD.	A	4	6	6	N	0.71	0.10	0.00	0.00	0.23	0.284	\$ 2,510,806	Replace Superstructure and Repair Substructure	\$ 4,689,126	
22461	U	Richlands	0	ALLEGHENY ST.	P	7	4	5	N	0.07	0.20	0.00	0.60	0.59	0.250	\$ 481,587	Replace Superstructure and Repair Substructure	\$ 1,363,028	
29818	U	Buchanan	5130	Turndown Rd.	P	5	4	5	N	0.06	0.46	0.00	0.94	0.00	0.227	\$ 1,081,922	Replace Bridge	\$ 1,081,928	
22544	P	Tazewell	16	FAIRGROUND ROAD	A	5	4	7	N	0.45	0.12	0.00	0.39	0.00	0.204	\$ 4,482,139	Replace Bridge	\$ 4,482,162	
29802	U	Buchanan	4261	Bright Leaf Rd.	P	6	6	7	N	0.34	0.03	0.00	0.88	0.00	0.198	\$ 657,960	SD - Structural Evaluation	\$ 657,960	
30533	U	Buchanan	0	PRIVATE ENTRANCE	P	7	7	8	N	0.24	0.00	0.00	0.78	0.00	0.150	\$ 711,246	SD - Structural Evaluation	\$ 711,246	



# CEF = Cost-Effectiveness Factor

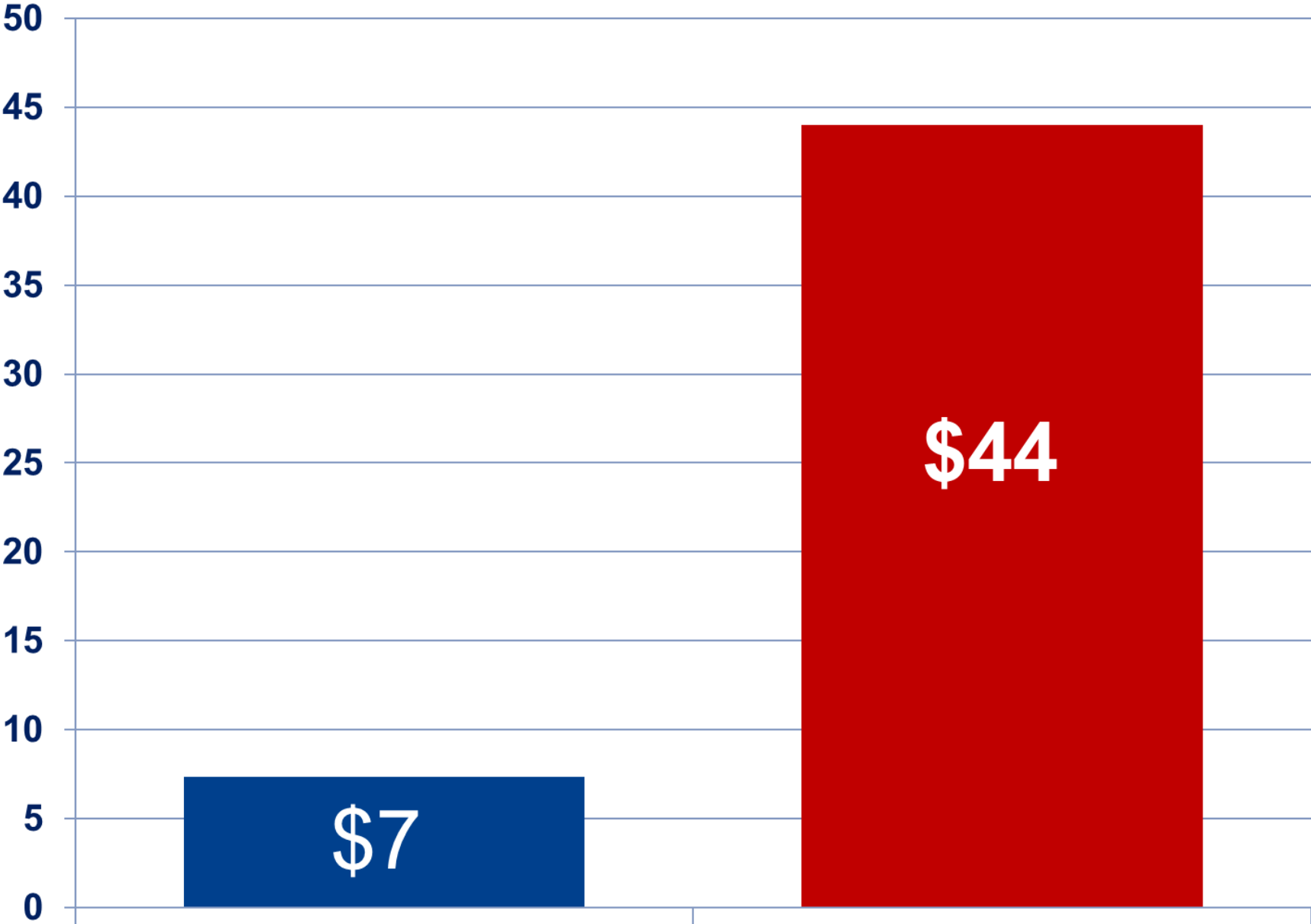


- **Agreement from of the District Bridge Engineer is required if the proposed scope and estimate vary significantly from that recommended by the Bridge Management System**
- **Localities are highly encouraged to investigate their bridges now and follow VDOT guidelines**
- **District Bridge Engineers are a resource that can help with technical guidance**

# The Importance of Cost-Effective Interventions

35 Year Funding Outlook to Replace Bridges at Age 70

Total Replacement Cost - \$Billions

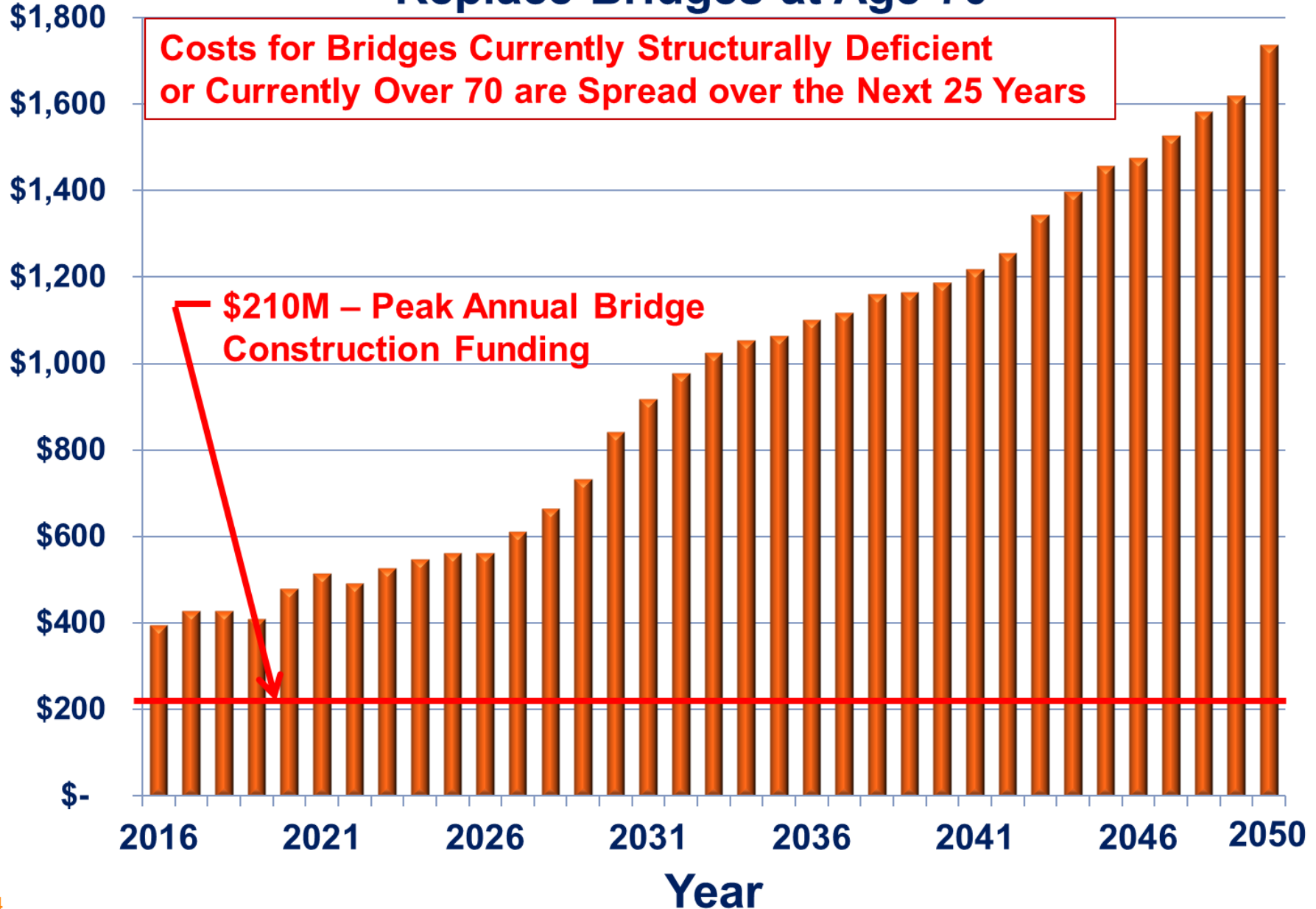


Available

Needed

# Annual Replacement Costs – 35 Year Outlook to Replace Bridges at Age 70

Annual Replacement Needs - Millions



Getting a Good Score

# *Targeted Repairs*

## Steel Beam End Repair - Before





## Steel Beam End Repair – During Construction





## Steel Beam End Repair - Final





# Superstructure and Substructure Surface Repair





## Superstructure and Substructure Surface Repair





## Superstructure and Substructure Surface Repair





## Superstructure and Substructure Surface Repair



## Investment Strategies

# ***Preservation Strategies***



# Fast Track Hydrodemolition



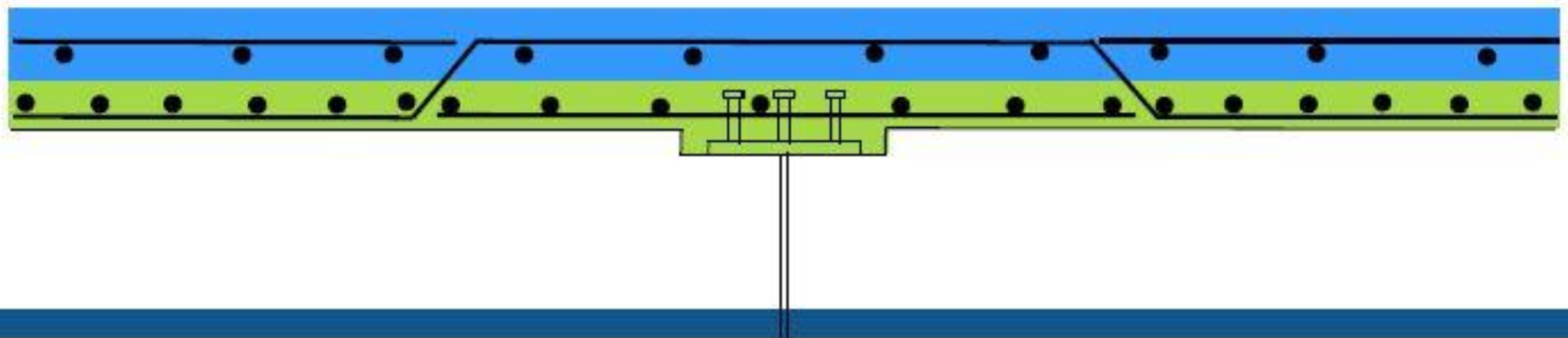


# Fast Track Hydrodemolition





## Deep Hydro – Structural Overlay





# Deep Hydrodemolition



# Deep Hydrodemolition





# Concrete Overlays





# Eliminating joints by constructing joint closures at piers





# Eliminating joints by constructing joint closures at piers



# ***Project Examples***









# Fast Track Hydrodemolition<sup>41</sup>



# I-64 over Shockoe Valley After Overlay



# I-64 Over Shockoe Valley Project Summary

## Repair and Preservation

Overlay	\$6M
Beam Repairs	\$2M
Painting	\$11M
Substructure Surface Repair	\$2M
Joint Elimination	\$1M (at a later date)
<b>Total</b>	<b>\$22M</b>

<b>Replacement</b>	<b>\$125M</b>
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# Discussion